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Study on unsaturated fatty acids as tau protein aggregation triggers *In vitro*

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ABSTRACT

Alzheimer ´disease is considered as one of the most important neurodegenerative disorders that are outbreak in the world wide. Tau protein belongs to microtubule associated protein ´s family (MAPS) which dramatic exists in central neuronal system and neuron ´s axons. Also Tau protein assists to microtubule ´s structure stability. There are a lot of factors that is affected on proteins' natural function which eventuates protein aggregation in neuronal system. Tau is included two domains with positive charge which is named proline rich region and Microtubule binding region (MTBR) that could interact with anionic fatty acids with negative net charge. Tau protein was expressed and purified through Stefan Barghorn protocol with some changes. Tau protein Purification was detected with SDS-PAGE gel chromatography. The data have been analyzed with ThT fluorescence emission spectrophotometry confirmed protein which interacted with poly unsaturated fatty acids, are aggregated and beget beta sheet amyloids. Arachidonic acid and oleic acid at the concentration about 10 mM have the potential to aggregate tau protein at the concentration about 20 µM. Zeta potential of the micelles have been measured through Dynamic light scattering (DLS). These data have been illustrated that anionic poly unsaturated fatty acids with more double bonds and zeta potential have the most effective factors in aggregation of tau protein. Hence oleic acid with the least double bonds and the most zeta potential has the maximum ability to aggregate tau protein.

Key words: Alzheimer ´s disease; Tau protein; Arachidonic acid; Oleic acid; Protein Aggregation